REMARKS

In the Final Office Action dated November 15, 2006, the Examiner took the following action: (1) objected to claims 11 and 23; (2) rejected claims 4-8, 13, 14, 16-18, 20, 26, 28-30, 36, 39-40, 45-47, 50-51, 69, and 71 under 35 USC §103(a) as being unpatentable over Vogelsang ('323) in view of Magellan Systems; (3) rejected claims 21-25, 41-42, and 72 under 35 USC §103(a) as being unpatentable over Vogelsang in view of Magellan Systems, and further in view of Blohowiak ('578); and (4) rejected claims 9-12, 15, 19, 27, 31-35, 37-38, 43-44, 48-49, and 52-55 as being unpatentable over Vogelsang in view of Magellan Systems, and further in view of Westre ('050).

Although the Examiner did not articulate his grounds for rejecting claim 70, for purposes of this Response, Applicants believe that the Examiner intended to reject claim 70 (rather than claim 71 which was previously cancelled) under 35 USC §103(a) as being unpatentable over Vogelsang ('323) in view of Magellan Systems. Accordingly, Applicants respectfully request reconsideration of the application in view of the foregoing amendments and the following remarks.

I. Claim Objections

The Examiner objected to claims 11 and 23 due to informalities. Applicants have amended the informalities noted by the Examiner in claims 11 and 23, and have also amended an informality in claim 16 noted by Applicants. Accordingly, Applicants respectfully request reconsideration and withdrawal of the objections.

II. Rejections Under §103(a)

All of the claims (claims 4-55, 69-70 and 72) stand rejected under 35 USC §103(a).

Claims 4-27

As amended, claim 4 recites:

> 4. A fiber-metal laminate comprising:
> at least two metallic layers, *each metallic layer having an inorganic polymer sol coating formed thereon*; and
> at least one fiber layer disposed between the metallic layers *adjacent to the inorganic polymer sol coatings*, wherein *the fiber layer contains a thermosetting resin matrix and a plurality of galvanically non-reactive poly diimidazo pyridinylene fibers*. (emphasis added).

Vogelsang ('323)

Vogelsang teaches a laminate that includes two metal sheets interconnected by an intermediate thermoplastic layer reinforced by continuous filaments. (2:4-43). According to Vogelsang, the intermediate thermoplastic layer is bonded directly to the metal sheets. (3:40-60).

Applicants respectfully submit that Vogelsang fails to disclose, teach, or fairly suggest the laminate recited in claim 4. Specifically, Vogelsang fails to teach or suggest a laminate that includes in relevant part two metallic layers, *each metallic layer having an inorganic polymer sol coating formed thereon,* and at least one fiber layer disposed between the metallic layers *adjacent to the inorganic polymer sol coatings*. (emphasis added). Vogelsang also fails to teach or suggest that the fiber layer contains a *thermosetting resin* matrix and a plurality of

galvanically non-reactive poly diimidazo pyridinylene fibers. (emphasis added). Vogelsang is silent as to the desirability of providing inorganic polymer sol coatings, and also the desirability of using galvanically non-reactive poly diimidazo pyridinylene fibers, as recited in claim 4. Vogelsang also fails to contemplate the use of thermosetting resin. For the foregoing reasons, claim 4 is allowable over Vogelsang.

Magellan Systems

Magellan Systems teaches the use of synthetic fibers having bi-directional hydrogen bonding. (p. 3, para. 4). According to Magellan Systems, the synthetic fibers are well-suited to use in ballistic protection, fire protection, fabrics, ropes and tethers, and light-weight composites. (p. 4, para. 2).

Magellan Systems fails to remedy the above-noted deficiencies of Vogelsang. More specifically, Magellan Systems fails to teach or fairly suggest a laminate that includes in relevant part two metallic layers, *each metallic layer having an inorganic polymer sol coating formed thereon,* and at least one fiber layer disposed between the metallic layers *adjacent to the inorganic polymer sol coatings*. (emphasis added). Magellan Systems also fails to teach or suggest that the fiber layer contains a *thermosetting resin* matrix and a plurality of *galvanically non-reactive poly diimidazo pyridinylene fibers*. (emphasis added). Magellan Systems is silent as the use of synthetic fibers in conjunction with metal layers, and to the desirability of providing inorganic polymer sol coatings on such metal layers. Magellan Systems is also silent as to the desirability of using *galvanically non-reactive* fibers, as recited in claim 4. For the foregoing reasons, claim 4 is allowable over Magellan Systems, either singly or in any properly motivated combination with Vogelsang.

Blohowiak ('578)

Blohowiak teaches forming an organometallic film on a metal surface to promote bonding between the metal surface and an adhesive or resin. (3:1-30).

Blohowiak fails to remedy the above-noted deficiencies of Vogelsang and Magellan Systems. More specifically, Blohowiak fails to teach or fairly suggest a laminate that includes in relevant part two metallic layers, each metallic layer having *an inorganic polymer sol coating formed thereon,* and at least one fiber layer disposed between the metallic layers *adjacent to the inorganic polymer sol coatings*. (emphasis added). According to Blohowiak, it is desirable to apply an organometallic film on a metal surface, rather than an *inorganic polymer* sol coating as disclosed by Applicants. (emphasis added).

Blohowiak also fails to teach or suggest that the fiber layer contains a plurality of *galvanically non-reactive poly diimidazo pyridinylene fibers*. (emphasis added). For these reasons, claim 4 is allowable over Blohowiak, either singly or in any properly motivated combination with Vogelsang and Magellan Systems.

Westre ('050)

Westre teaches titanium-polymer hybrid laminates. (2:56-3:33). Specifically, Westre teaches that the resin of the laminate is selected to tenaciously bond with the titanium alloy foil. (3:27).

Westre fails to remedy the above-noted deficiencies of Vogelsang, Magellan Systems, and Blohowiak. More specifically, Westre fails to teach or fairly suggest a laminate that includes in relevant part two metallic layers, each metallic layer having *an inorganic polymer sol coating formed thereon,* and at least one fiber layer disposed between the metallic layers

adjacent to the inorganic polymer sol coatings. (emphasis added). According to Westre, that the resin of the laminate is selected to tenaciously bond with the titanium alloy foil (3:27), rather than to bond with an *inorganic polymer sol coating* as disclosed by Applicants. (emphasis added). Westre also fails to teach or suggest that the fiber layer contains a plurality of *galvanically non-reactive poly diimidazo pyridinylene fibers*. (emphasis added). For these reasons, claim 4 is allowable over Westre, either singly or in any properly motivated combination with Vogelsang, Magellan Systems, and Blohowiak.

Claims 5-27 depend from claim 4 and are allowable over the Cited References (Vogelsang, Magellan Systems, Blohowiak, and Westre) at least due to their dependencies on claim 4, and also due to additional limitations recited in those claims.

Claims 28-44

Similarly, amended claim 28 recites:

> 28. A fiber-metal laminate comprising:
> at least two layers of aluminum alloy, *each aluminum alloy layer having an inorganic polymer sol coating formed thereon*; and
> *at least one resin-fiber ply bonded between the aluminum alloy layers adjacent to the inorganic polymer sol coatings*, the ply including a *thermosetting resin matrix and a plurality of galvanically non-reactive poly diimidazo pyridinylene fibers*, a majority of the plurality of galvanically non-reactive poly diimidazo pyridinylene fibers being aligned along a primary stress direction. (emphasis added).

For the reasons set forth above, the Cited References, either singly or in combination, fail to disclose, teach, or fairly suggest the laminate recited in claim 28. Specifically, the Cited References fail to teach or suggest a laminate that includes in relevant part two layers of aluminum alloy, *each aluminum alloy layer having an inorganic polymer sol coating formed*

thereon, and *at least one resin-fiber ply bonded between the aluminum alloy layers adjacent to the inorganic polymer sol coatings*, the ply including a *thermosetting resin matrix and a plurality of galvanically non-reactive poly diimidazo pyridinylene fibers*. (emphasis added). For the reasons set forth above, these limitations are not disclosed, taught, or fairly suggested by the Cited References. Accordingly, claim 28, and claims 29-44 depending therefrom, are allowable over the Cited References.

Claims 45-55

Amended claim 45 recites:

> 45. A composite aircraft component comprising:
> at least two aluminum alloy foil layers that are pre-treated each having a thickness in a range from 0.004 inches to 0.025 inches, *each aluminum alloy foil layer having an inorganic polymer sol coating formed thereon*; and
> at least one polymeric composite layer bonded between the at least two foil layers, *the composite layer including a thermosetting resin matrix and a plurality of galvanically non-reactive aligned poly diimidazo pyridinylene fibers*, the plurality of galvanically non-reactive poly diimidazo pyridinylene fibers being aligned along a primary stress direction. (emphasis added).

For the reasons set forth above, the Cited References, either singly or in combination, fail to disclose, teach, or fairly suggest the laminate recited in claim 45. Specifically, the Cited References fail to teach or suggest a component that includes in relevant part two aluminum alloy foil layers, *each aluminum alloy foil layer having an inorganic polymer sol coating formed thereon,* and at least one polymeric composite layer bonded between the at least two foil layers, *the composite layer including a thermosetting resin matrix and a plurality of galvanically non-*

reactive aligned poly diimidazo pyridinylene fibers. (emphasis added). For the reasons set forth above, these limitations are not disclosed, taught, or fairly suggested by the Cited References. Accordingly, claim 45, and claims 46-55 depending therefrom, are allowable over the Cited References.

Claims 69-70 and 72

Amended claim 45 recites:

> 69. A fiber-metal laminate produced according to a method comprising:
>
> providing a plurality of metallic layers, *each metallic layer having an inorganic polymer sol coating formed thereon*;
>
> *aligning a plurality of galvanically non-reactive poly diimidazo pyridinylene fibers having a modulus of elasticity of greater than 270 GPa into a thermosetting resin of at least one fiber layer*, the plurality of galvanically non-reactive poly diimidazo pyridinylene fibers being aligned along a primary stress direction; and
>
> sandwiching the *at least one fiber layer between the plurality of metallic layers adjacent to the inorganic polymer sol coatings*. (emphasis added).

For the reasons set forth above, the Cited References, either singly or in combination, fail to disclose, teach, or fairly suggest the method recited in claim 69. Specifically, the Cited References fail to teach or suggest a method that includes in relevant part providing a plurality of metallic layers, *each metallic layer having an inorganic polymer sol coating formed thereon*, and *aligning a plurality of galvanically non-reactive poly diimidazo pyridinylene fibers having a modulus of elasticity of greater than 270 GPa into a thermosetting resin of at least one fiber layer*, and sandwiching the *at least one fiber layer between the plurality of metallic layers adjacent to the inorganic polymer sol coatings*. (emphasis added). For the reasons set forth

above, these limitations are not disclosed, taught, or fairly suggested by the Cited References. Accordingly, claim 69, and claims 70 and 72 depending therefrom, are allowable over the Cited References.

CONCLUSION

For the foregoing reasons, Applicant respectfully submits that pending claims 4-55, 69-70 and 72 are now in condition for allowance. If there are any remaining matters that may be handled by telephone conference, the Examiner is kindly invited to contact the undersigned attorney at the telephone number listed below.

Respectfully Submitted,

Dated: May 15, 2007 By: Dale C. Barr

Dale C. Barr
Lee & Hayes, PLLC
Reg. No. 40,498
(206) 315-7916